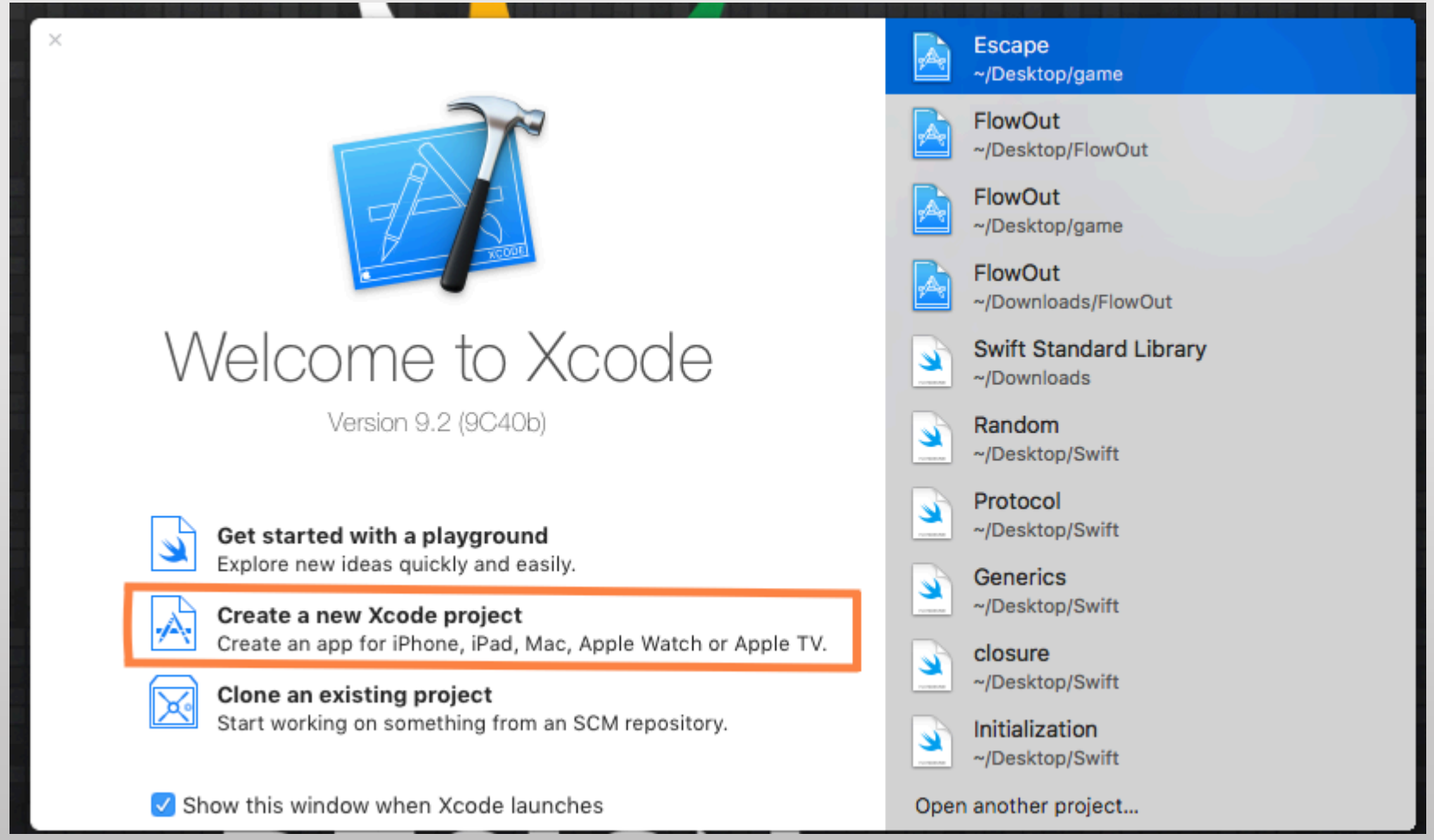
GD2S03
Advanced Software Engineering & Programming for Games

MEDIA DESIGN SCHOOL

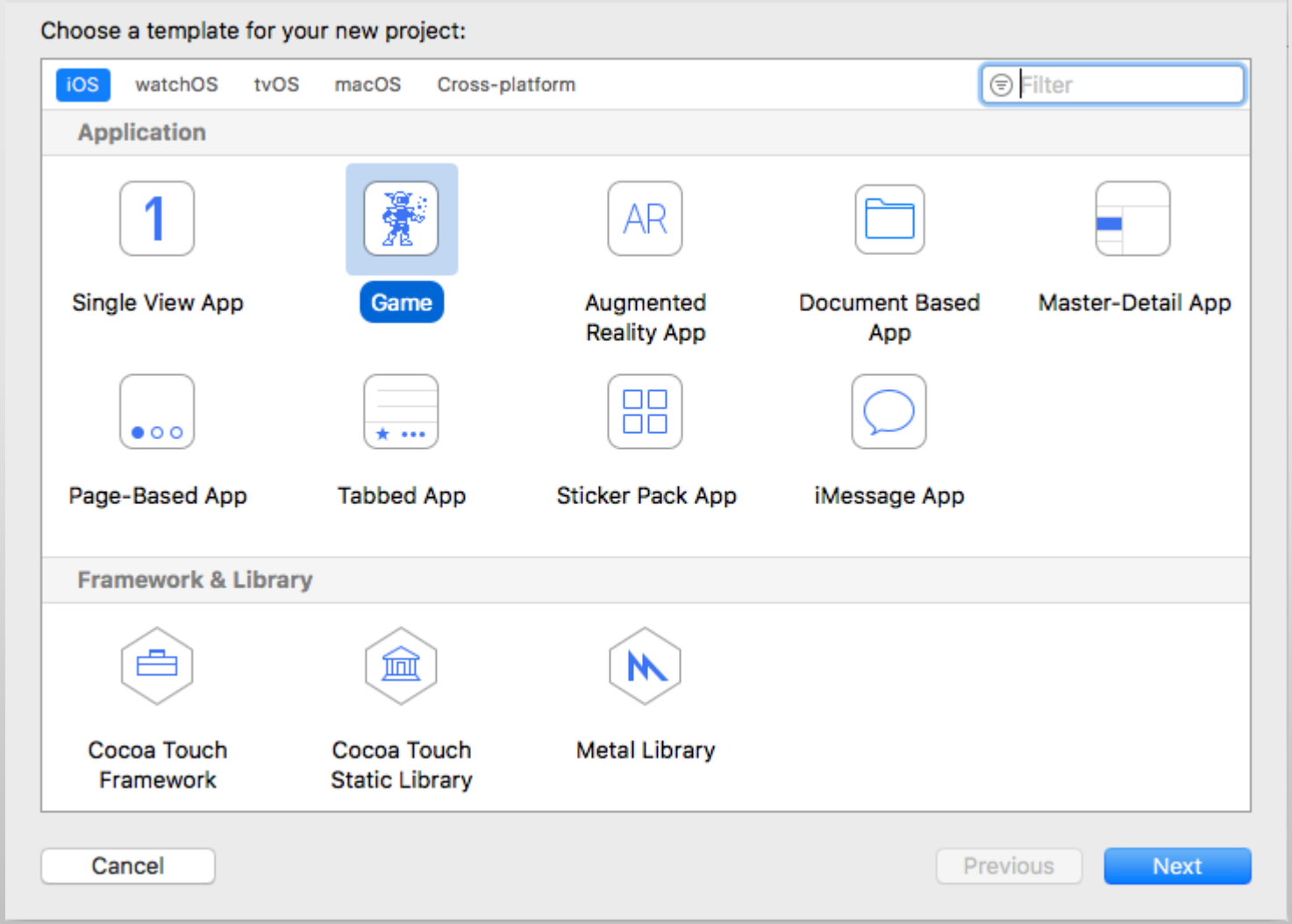
Bachelor of Software Engineering(BSE)
Game Development

- Overview
  - Project
  - SKView
  - SKNode
  - SKScene
  - SKSpriteNode
  - SKShapeNode
  - SKLabelNode

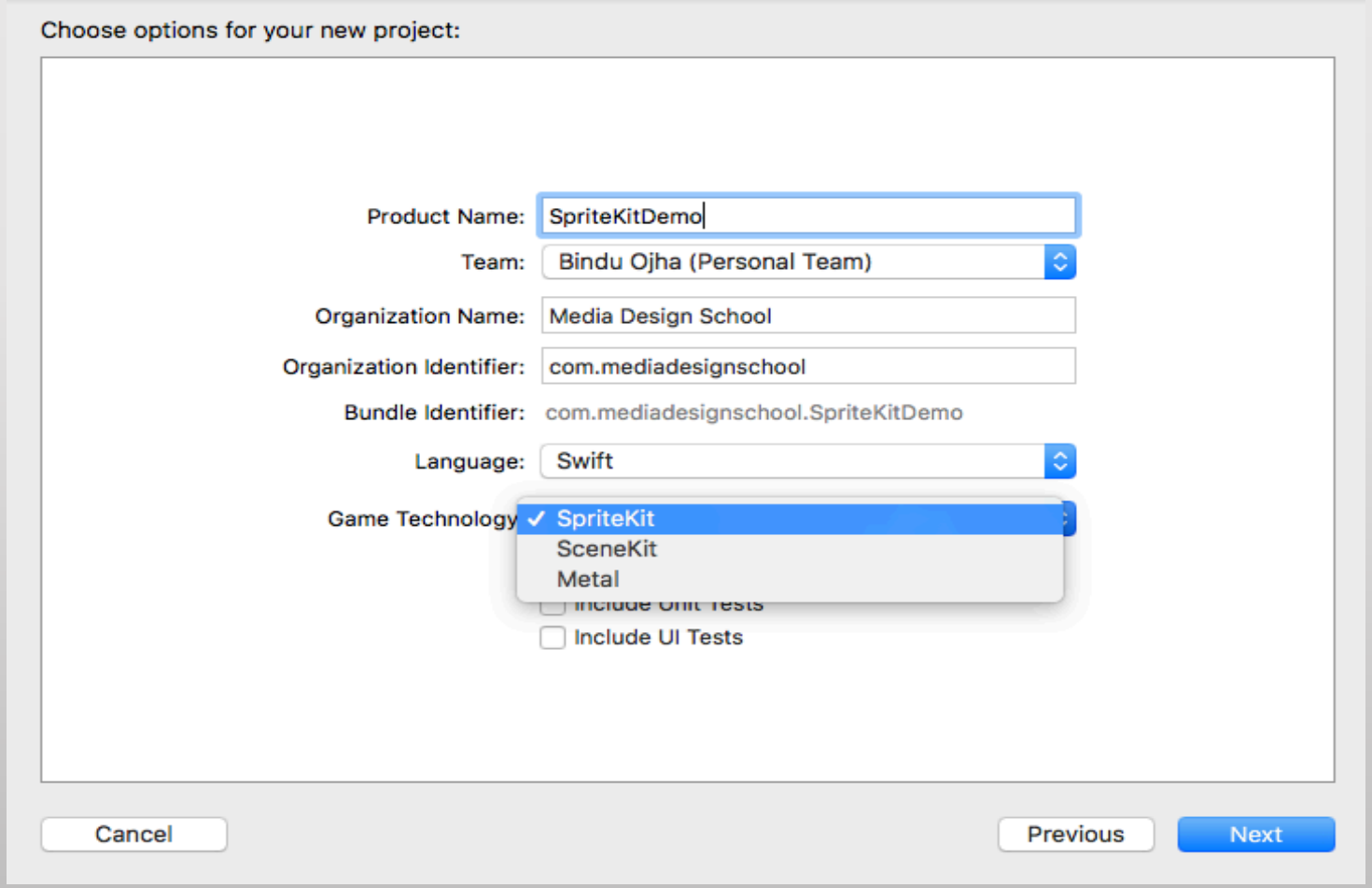
- Click on Xcode to get the below screen
- Select "***create a new Xcode Project***"



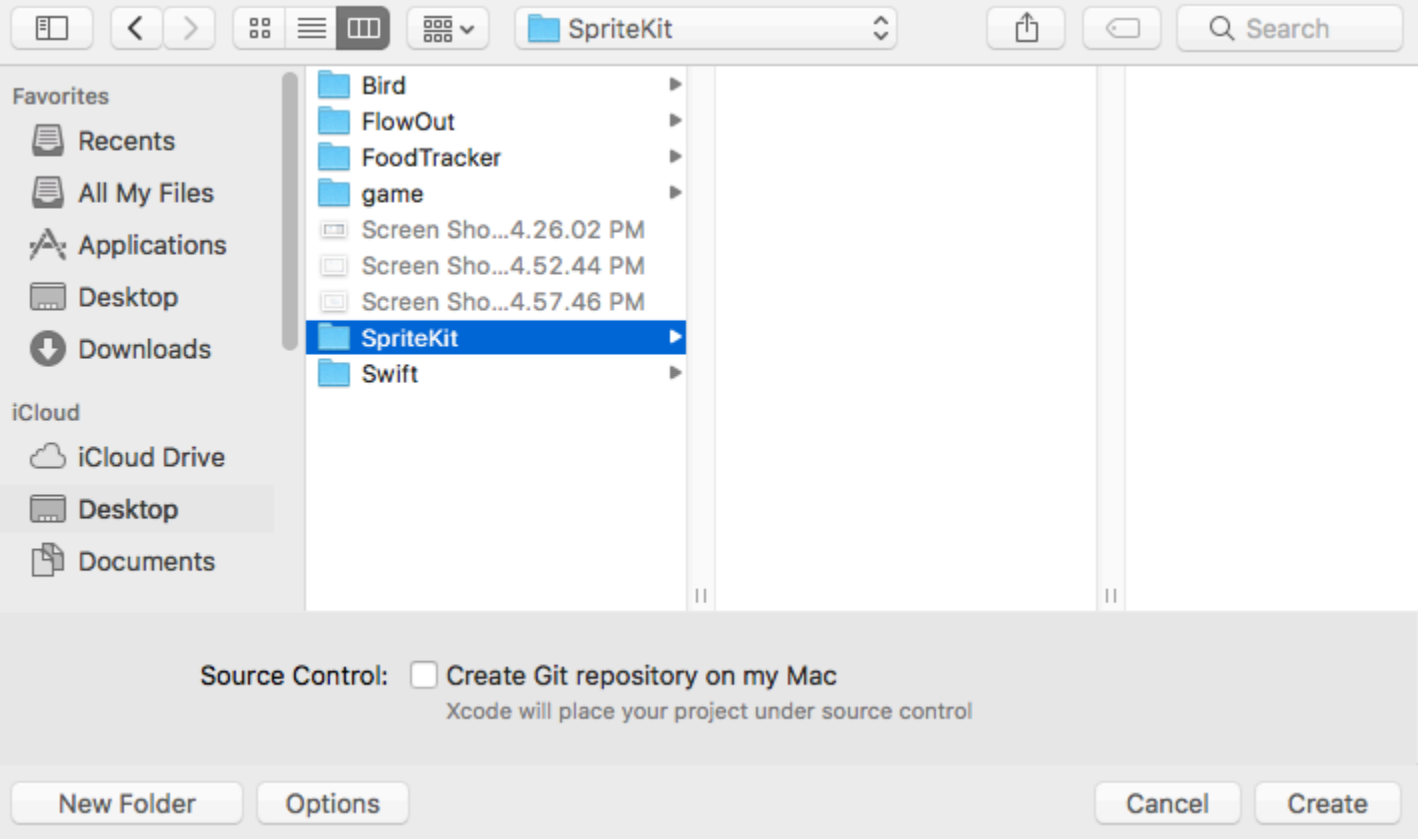
- Select iOS and Game
- Click Next



- Product Name should be the name of you product (e.g SpriteKitDemo)
- Enter ***Team***, ***Organization Name*** and ***Organization Identifier*** (starts with com)
- Select ***Swift*** as language and ***SpriteKit*** as Game Technology
- Click **Next**



- Select the folder where project has to be stored.
- Uncheck *Git repository on my mac* unless you have one
- Click *Create*



- Modify section ***signing*** and ***Deployment Info*** as required

SpriteKitDemo 〉 iPhone 6 | Finished

SpriteKitDemo
- SpriteKitDemo
  - AppDelegate.swift
  - GameScene.sks
  - Actions.sks
  - GameScene.swift
  - GameViewController.swift
  - Main.storyboard
  - Assets.xcassets
  - LaunchScreen.storyboard
  - Info.plist
- Products

SpriteKitDemo

SpriteKitDemo | General | Capabilities | Resource Tags | Info | Build Settings | Build Phases | Build Rules

Identity

Display Name	SpriteKitDemo
Bundle Identifier	com.mediadesignschool.SpriteKitDemo
Version	1.0
Build	1

Signing

- [x] Automatically manage signing
  Xcode will create and update profiles, app IDs, and certificates.

Team	Bindu Ojha (Personal Team)
Provisioning Profile	Xcode Managed Profile
Signing Certificate	iPhone Developer: bindu.ojha@mediadesignscho...

Deployment Info

Deployment Target	11.2
Devices	Universal
Main Interface	Main

Device Orientation
- [x] Portrait
- [ ] Upside Down
- [x] Landscape Left
- [x] Landscape Right

Status Bar Style	Default

- [x] Hide status bar
- [x] Requires full screen

App Icons and Launch Images

App Icons Source	AppIcon
Launch Images Source	Use Asset Catalog...
Launch Screen File	LaunchScreen

Embedded Binaries

Identity and Type

Name	SpriteKitDemo
Location	Absolute
	SpriteKitDemo.xcodeproj
Full Path	/Users/bindu/Desktop/SpriteKit/SpriteKitDemo/SpriteKitDemo.xcodeproj

Project Document

Project Format	Xcode 8.0-compatible
Organization	Media Design School
Class Prefix	

Text Settings

Indent Using	Spaces
Widths	4 (Tab) / 4 (Indent)

- [x] Wrap lines

No Matches

Auto | Filter | All Output | Filter | Filter

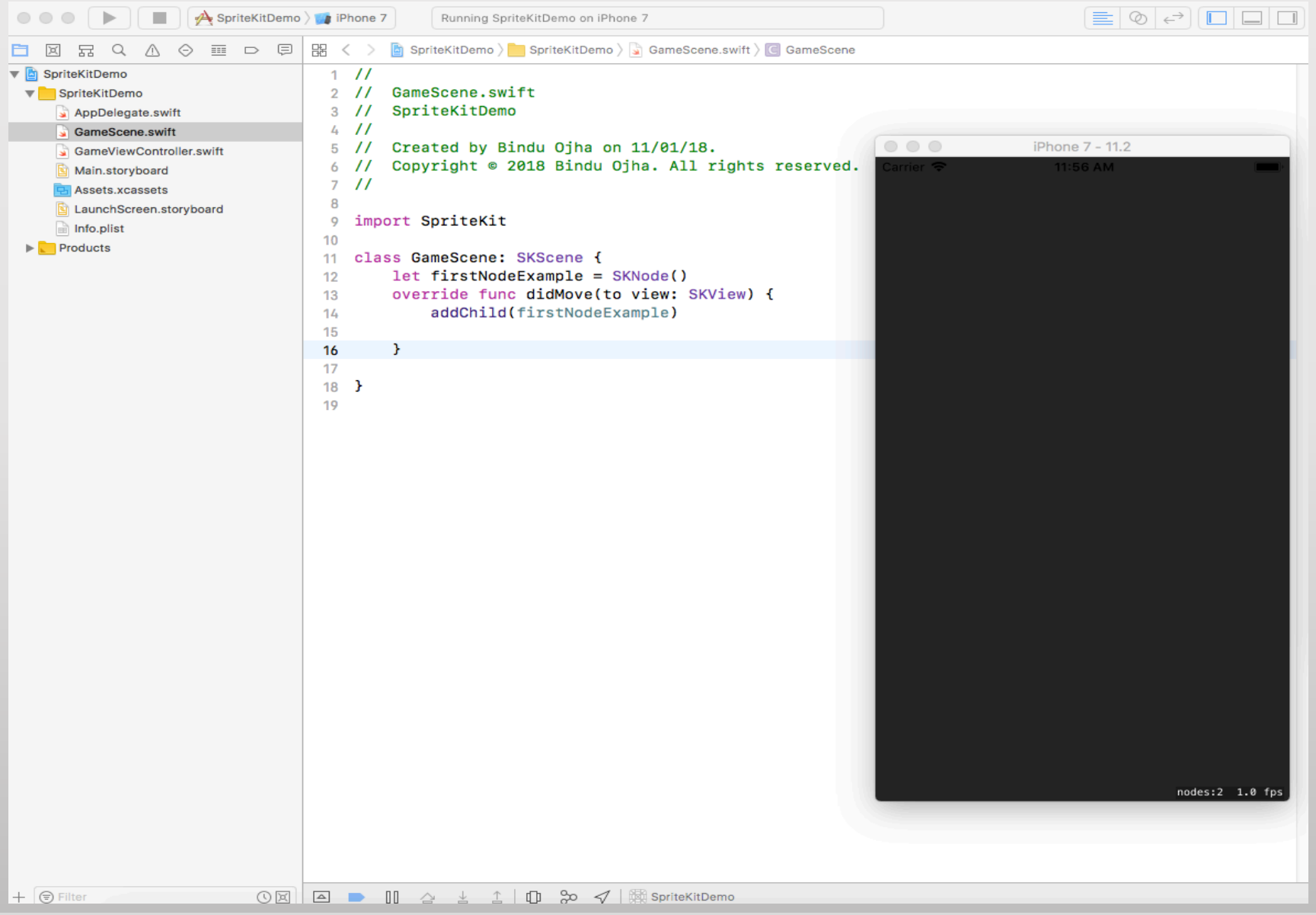
- Delete *Gamescene.sks* and *Actions.sks*
- In *GameScene.swift* file, delete everything except function ***didMove***
- Delete the body of function ***didMove***
- From file *GameViewController.swift*, delete everything except function ***viewDidLoad***
- Execute to see the result

```
import UIKit
import SpriteKit

class GameViewController: UIViewController {

    override func viewDidLoad() {
        super.viewDidLoad()

        if let view = self.view as! SKView? {
            // Load the SKScene from 'GameScene.sks'
            let scene = GameScene(size: view.bounds.size)
                // Set the scale mode to scale to fit the window
                scene.scaleMode = .aspectFill
                // Present the scene
                view.presentScene(scene)
                view.ignoresSiblingOrder = true
                view.showsFPS = true
                view.showsNodeCount = true
                view.showsPhysics = true
        }

    }
}
```

SKView, SKNode and SKScene

- SKView is an object that displays SpriteKit content.
- **SKView** object is used for rendering and animation purpose. A view object is placed inside a window to render its contents.
- Contents in a game are organized into scenes, represented by **SKScene** objects. A scene holds sprites and other contents to be rendered.
- At any given time, a view presents only one scene and **SKTransition** class can be used to animate between two scenes.
- **SKScene** class is inherited from **SKNode** class. Nodes are fundamental building blocks for all contents.
- In a scene, **SKScene** object is used as the root node and all the contents of that scene is represented by tree of node objects (**SKNode**)
- Parent node passes its coordinate system to its descendants' and child's position is specified in the coordinate system defined by its parent.
- A node also applies other properties to its content and the content of its descendants. For example, when a node is rotated, all of its descendants are rotated also.
- The **SKNode** class does not draw anything but the scene (SKScene object) implements the per-frame logic and content processing. SKNode class apply its properties to its descendents.

- **addchild** function is used to add child to a node
- **didMove** function is called when scene is first loaded
- Node count is 2 as scene itself represents a node.
- Assets must be stored in **Assets.xcassets**

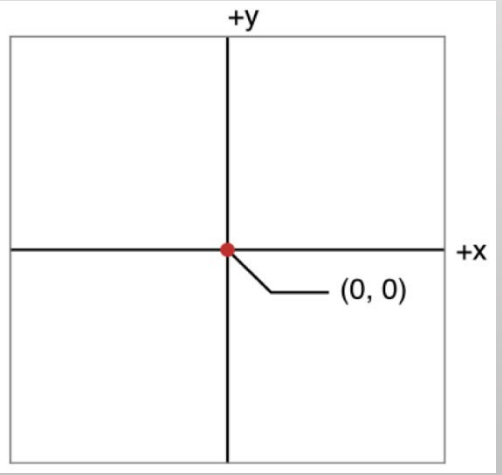


SKSPriteNode

- An SKSpriteNode is used to draw a texture, an image or a colored square.
- An SKSpriteNode object can be drawn either as a rectangle with a texture mapped onto it or as colored, untextured rectangle.
- Texture sprites are more common as it represents the custom artwork which represents the characters in the game or even backgrounds etc.

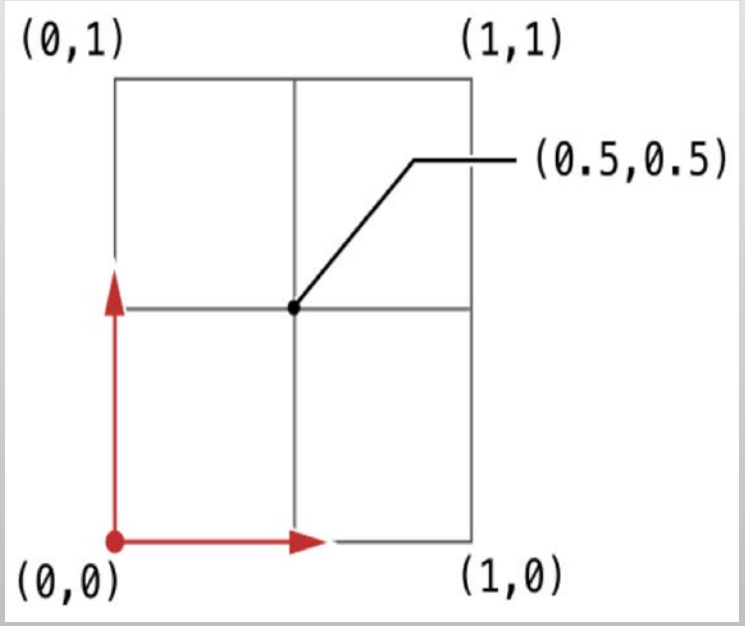
Co-ordinate System

- When a SKNode is placed in the node tree, its *position* property places it within a coordinate system provided by its parent.
- SpriteKit uses the same coordinate system on both iOS and macOS.
- A positive x coordinate goes to the right and a positive y coordinate goes up the screen.



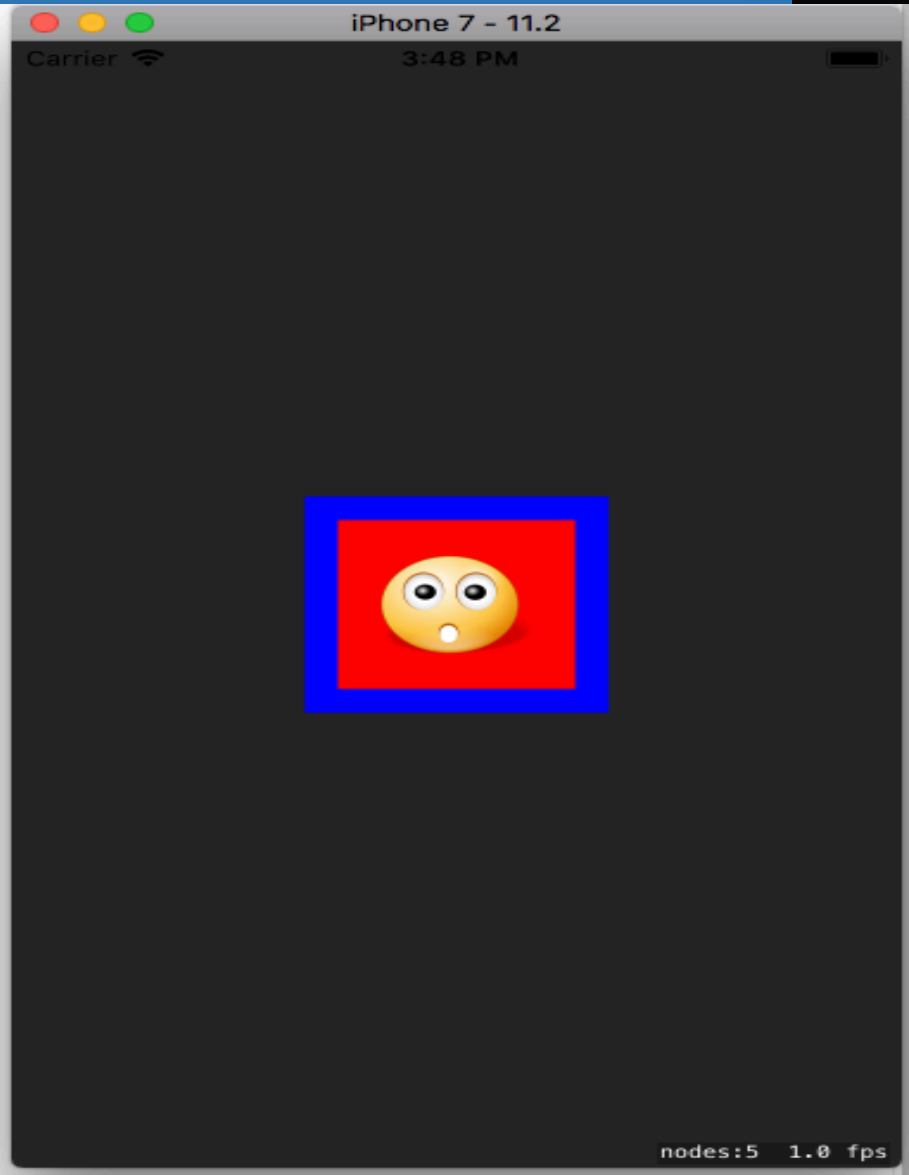
SKSpriteNode

- **AnchorPoint**
- Anchor points are specified in the unit coordinate system, shown in the following illustration.
- The unit coordinate system places the origin at the bottom left corner of the frame and (1,1) at the top right corner of the frame.
- A sprite's anchor point defaults to (0.5,0.5), which corresponds to the center of the frame.
- When an SKSpriteNode is added to an SKNode, by default it's anchorpoint is placed at node's position
- When an SKSpriteNode is added to another SKSpriteNode, by default it's anchorpoint is placed at anchorpoint of parent node.
- An SKSpriteNode's origin is the bottom left point of the frame



- **Frame**
- A rectangle in the parent's coordinate system that contains the node's content, ignoring the node's children.

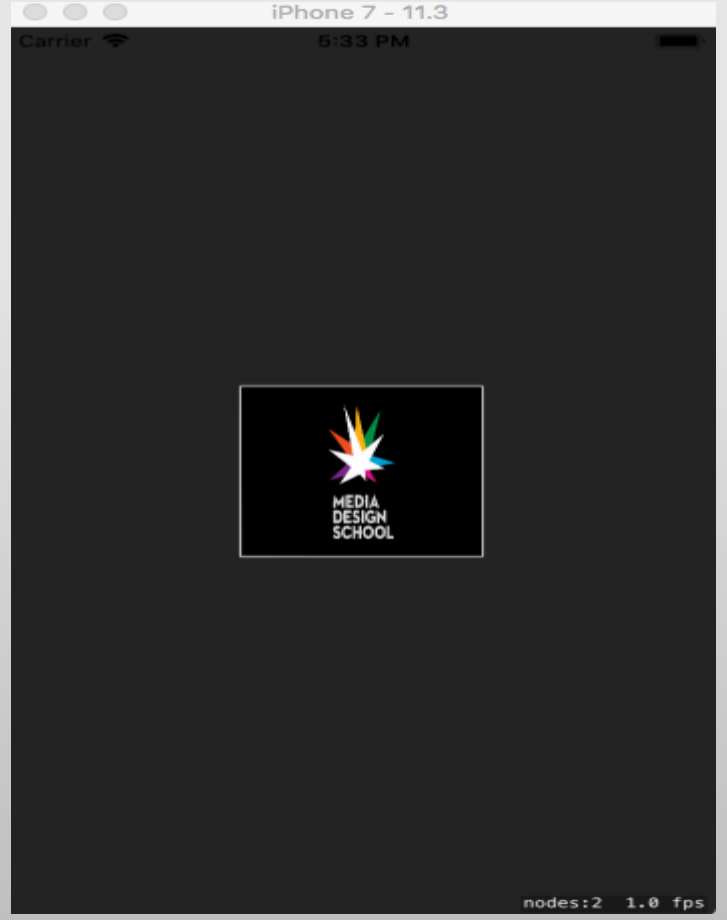
```
import SpriteKit

class GameScene: SKScene {
    let firstNode = SKNode()
    let nonTexturedSriteNodeFirst = SKSpriteNode()
    let nonTexturedSriteNodeSecond = SKSpriteNode()
    let texturedSpriteNode = SKSpriteNode(imageNamed: "surprised")

    override func didMove(to view: SKView) {
        nonTexturedSriteNodeSecond.addChild(texturedSpriteNode)
        nonTexturedSriteNodeFirst.addChild(nonTexturedSriteNodeSecond)
        firstNode.addChild(nonTexturedSriteNodeFirst)
        addChild(firstNode)

        firstNode.position = CGPoint(x: self.frame.midX, y: self.frame.midY)
        nonTexturedSKSpriteNode()
        texturedSKSpriteNode()
    }

    func texturedSKSpriteNode(){
        texturedSpriteNode.size = CGSize(width: 64, height: 64)
        texturedSpriteNode.anchorPoint = CGPoint(x: 0.5, y: 0.5)
    }

    func nonTexturedSKSpriteNode(){
        nonTexturedSriteNodeFirst.name = "first"
        nonTexturedSriteNodeFirst.color = UIColor.blue
        nonTexturedSriteNodeFirst.size = CGSize(width: 128, height: 128)
        nonTexturedSriteNodeFirst.anchorPoint = CGPoint(x: 0.5, y: 0.5)

        nonTexturedSriteNodeSecond.name = "second"
        nonTexturedSriteNodeSecond.color = UIColor.red
        nonTexturedSriteNodeSecond.size = CGSize(width: 100, height: 100)
        nonTexturedSriteNodeSecond.anchorPoint = CGPoint(x: 0.5, y: 0.5)
        nonTexturedSriteNodeSecond.position = CGPoint(x: 0, y: 0)

    }
}
```



SKShapeNode

- Shape nodes are useful for content that cannot be easily decomposed into simple textured sprites.
- Shape nodes are also very useful for building and displaying debugging information on top of your game content.
- However, the SKSpriteNode class offers higher performance than this class, so use shape nodes sparingly.

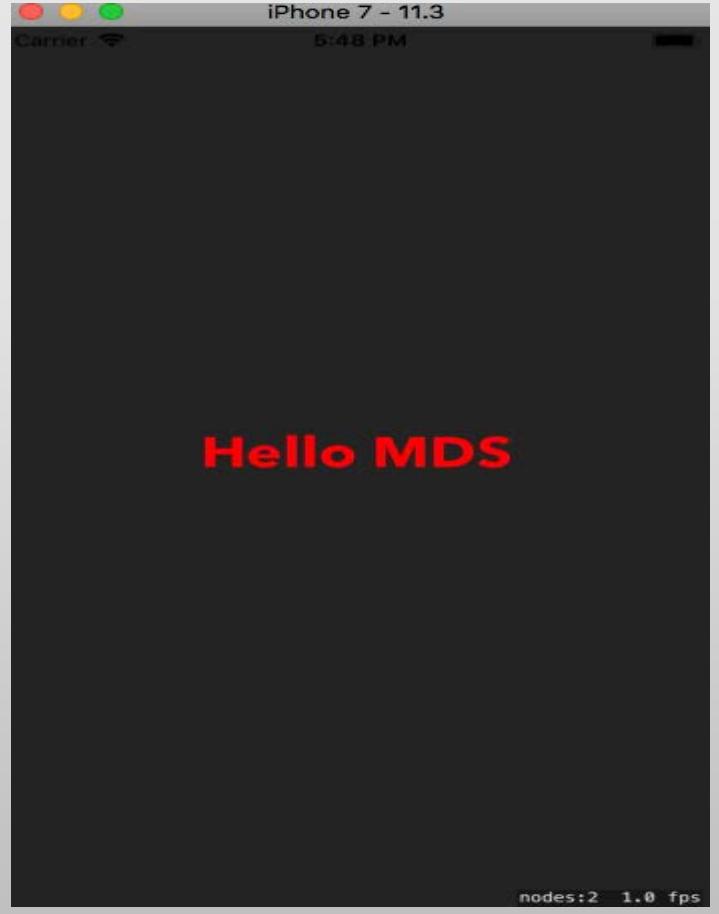
```
import UIKit
import SpriteKit

class GameScene: SKScene {
    var shape: SKShapeNode!

    override func didMove(to view: SKView) {
        createShape()
    }

    func createShape(){
        shape = SKShapeNode(rectOf: CGSize(width: 128, height: 128))
        shape.fillColor = SKColor.white
        shape.fillTexture = SKTexture(imageNamed: "MDSlogo")
        shape.position = CGPoint(x: self.frame.midX, y: self.frame.midY)
        self.addChild(shape)
    }
}
```



SKLabelNode

- Just about every game needs to display text at some point, even if it is just to display “Game Over” to the player.
- If you had to implement this yourself in OpenGL, it would take a fair amount of work to get it correct.
- But the SKLabelNode class does all of the work necessary to load fonts and create text for display.

```
import UIKit
import SpriteKit

class GameScene: SKScene {
    var label: SKLabelNode!

    override func didMove(to view: SKView) {
        createLabel()
    }

    func createLabel(){
        label = SKLabelNode()
        label.text = "Hello MDS"
        label.fontSize = 32.0
        label.fontName = "AvenirNext-Bold"
        label.fontColor = UIColor.red
        label.position = CGPoint(x: self.frame.midX, y: self.frame.midY)
        self.addChild(label)
    }
}
```



- Exercise
  - Change the anchor points and see the position of nodes with respect to parent node.
  - Create various shapes using SKShapeNode.
  - Use SKLabelNode to create various game labels.